

**Discharger: Cliffs Erie-Hoyt Lakes Mining Area**  
**Permit Number: MN0042536**  
**Outfall Number: SD026**  
**Date: 4-15-13**

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*Background*

The facility is a closed mine site. Culvert outfall **SD026** (formerly 251) routes flow, at maximum and average rate of 0.9 and 0.4 MGD, from the N½, Section 16, T59N, R14W, seepage discharge area, the Green Water Ponds, the Area 2 Shops Area and the Knox Rail Refueling Area. The seepage discharge may originate in part from Area 1E of the Hoyt Lakes tailings basin. Flow from the Area 2 shops toward outfall SD026 includes roof and yard runoff from the Locomotive Shop (Building 203), Carpentry/Service Shop, Truck Storage, locomotive fueling and a fuel storage site, and various indoor and outdoor dry storage sites and buildings. The annual 7Q<sub>10</sub> flow in the receiving water is 0 cfs due to the headwater nature of the watershed. The analysis below is based on data submitted to date.

*Reasonable Potential for Chemical Specific Pollutants (40CFR122.44(d)(1))*

Federal regulations require MPCA to evaluate the discharge to determine whether the discharge has the reasonable potential to cause or contribute to a violation of water quality standards. The Agency must use acceptable technical procedures, accounting for variability (coefficient of variation, or CV), when determining whether the effluent causes, has the reasonable potential to cause, or contribute to an excursion of an applicable water quality standard. Projected effluent quality (PEQ) derived from effluent monitoring data is compared to Preliminary Effluent Limits (PELs) determined from mass balance inputs. Both determinations account for effluent variability. Where PEQ exceeds the PEL, there is reasonable potential to cause or contribute to a water quality standards excursion. When Reasonable Potential is indicated the permit must contain a water quality-based effluent limit (WQBEL) for that pollutant.

From the table below Chloride, Mercury, Boron, Cobalt and Molybdenum indicated no reasonable potential to cause or contribute to an excursion above the applicable water quality standard. No effluent limits are needed.

The following table contains the inputs to the reasonable potential analysis for chloride, bicarbonate, sulfate, hardness, TDS, specific conductance, boron, cobalt, molybdenum and mercury. These pollutants were evaluated on the basis of analytical measurements that made evident the need for a full determination. Where Projected Effluent Quality (PEQs) exceed Preliminary Effluent Limitations (PELs), a Water Quality-based Effluent Limit (WQBEL) is needed.

PARAMETER	Chloride (mg/l)	Bicarbonates (mg/l)	Sulfate (mg/l)	Hardness (mg/l)	TDS (mg/l)	Spec. Cond. (umhos/cm)	Boron (ug/l)	Cobalt (ug/l)	Molybdenum (ug/l)	Hg (ng/l)
Maximum measured effluent value	21.5	687	360	631	866	1393	304	2.5	53	.9
Projected effluent quality (PEQ) @ n data points	21.5 (53)	687 (81)	360 (55)	631 (81)	866 (55)	1393 (154)	334 (44)	2.75 (44)	58 (44)	1.26 (18)
Site max design flow (mgd)	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Receiving water 7Q10 flow (mgd)	0	0	0	0	0	0	0	0	0	0
Background concentration	0	0	0	0	0	0	0	0	0	0
Continuous standard (cs)	230	305	10	500	700	1000	500	5	698	1.3
Maximum standard (ms)	860	NA	NA	NA	NA	NA	NA	436	NA	NA
Final acute value (FAV)	1720	NA	NA	NA	NA	NA	NA	872	NA	NA
Mass Balance - cs	230	305	10	500	700	1000	500	5	698	1.3
Mass Balance - ms	860	NA	NA	NA	NA	NA	NA	436	NA	NA
Coefficient Of Variation (CV)	.19	.2	.18	.24	.13	.27	.19	.97	.29	.6
Long Term Average: LTA cs	186	280	9.27	451	661	894	462	1.9	505	1.014
LTAs	570	NA	NA	NA	NA	NA	NA	91	NA	NA
Preliminary Effluent Limit (PEL): Daily Maximum	280	436	13	764	895	1585	699	9.1	935	3.2
Monthly Average	228	350	11	589	770	1193	569	4	690	1.8
Reasonable Potential PEQ>PEL (Dmax/FAV)	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No

### Reasonable Potential Conclusions

Reasonable potential to cause or contribute to the excursion above a water quality standard has been indicated for bicarbonates, sulfate, hardness, TDS and specific conductance. A water quality-based effluent limit (WQBEL) is needed. The calculation of WQBELs follows.

*Mercury*- Monitoring results of the effluent include 18 data points at a default CV of .6. Projected effluent quality (PEQ) is derived as an upper bound value from the highest

value measured (.9 ng/l), and the determined variability ( $CV = .6$ ) and number of data points (18). The preliminary effluent limit (PEL) calculation assumes that the background mercury concentration is set at the water quality standard for the Lake Superior Basin (1.3 ng/l). To assure that the discharge does not cause or contribute to a water quality standards excursion for mercury impaired waters, the numeric water quality standard (1.3) is applied at the point of discharge for the mass balance equation for the subsequent preliminary effluent limit calculations. Where PEQ exceeds the PEL (Daily Max or Monthly Average), there is reasonable potential to cause or contribute to a water quality standards excursion. Since PEQ does not exceed the PEL in this case, reasonable potential to cause or contribute to an excursion above water quality standards is not indicated. A water quality-based effluent limit (WQBEL) is not needed.

*Whole Effluent Toxicity – No current limit- Monitoring only*

The recommendation for the permit is to include WET monitoring requirements; limits are not currently applicable to this discharge. Specifically the permit should include quarterly chronic WET monitoring the first year followed by annual testing. Tests must use pH control procedures to provide additional assurance that any toxicity that may be present is unrelated to this artifact. Continued annual monitoring will track the effect of any future changes.

## **2. Chronic Whole Effluent Toxicity (WET) Testing**

- 2.1 The Permittee shall conduct quarterly chronic toxicity test batteries on SD026 beginning with the first full calendar quarter following the issuance of permit. The first quarter results are due by the end of the first calendar quarter following issuance of permit.
- 2.2 Submit the first quarterly chronic test battery results.
- 2.3 Submit the second quarterly chronic test battery results.
- 2.4 Submit the third quarterly chronic test battery results.
- 2.5 Submit the fourth quarterly chronic test battery results.
- 2.6 Annual chronic test batteries shall be conducted in each succeeding year for the remainder of the permit. The first annual results are due one year from the date of the final quarter results and annually thereafter.
- 2.7 Any test that exceeds 1.0 TUC shall be re-tested according to the Positive Toxicity Result requirements that follow to determine if toxicity is still present above 1.0 TUC

### **Species and Procedural Requirements**

- 2.8 Tests shall be conducted in accordance with procedures outlined in EPA-821-R-02-013 "Short-term Methods for Estimating the Chronic Toxicity of

Effluents and Receiving Waters to Freshwater Organisms” - Fourth Edition (Chronic Manual), and any revisions to the Manual. Any test that is begun with an effluent sample that exceeds a total ammonia concentration of 5 mg/l shall use the carbon dioxide-controlled atmosphere technique to control pH drift.

- 2.9 Test organisms for each test battery shall include the fathead minnow (*Pimephales promelas*)-Method 1000.0 and *Ceriodaphnia dubia*-Method 1002.0.
- 2.10 Static renewal chronic serial dilution tests of the effluent shall consist of a control, 6, 25, 50, 75 and 100% effluent
- 2.11 All effluent samples shall be flow-proportioned, 24-hour composites. Test solutions shall be renewed daily from each fresh composite. Testing of the effluent shall begin within 36 hours of sample collection. Receiving water collected outside of the influence of discharge shall be used for dilution and controls.
- 2.12 Any other circumstances not addressed in the previous requirements or that require deviation from that which is specified in the previous requirements shall first be approved by the MPCA.

#### **Quality Control and Report Submittals**

- 2.13 Any test that does not meet quality control measures, or results that the Permittee believes reflect an artifact of testing shall be repeated within two weeks. These reports shall contain information consistent with the report preparation section of the Chronic Manual. The MPCA shall make the final determination regarding test validity.

#### **Positive Toxicity Test Result for WET**

- 2.14 Should a test exceed 1.0 TUC for whole effluent toxicity, the permittee shall conduct two repeat test batteries to be completed within forty five days after completion of the positive test. These tests will be used to determine if toxicity exceeding 1.0 TUC remains present. If no toxicity is present above 1.0 TUC for any test species, the permittee shall return to the test frequency specified by the permit. If the repeat test batteries indicate toxicity above 1.0 TUC, the permittee shall submit for Agency review a plan for conducting a Toxicity Reduction Evaluation (TRE), and at a minimum provide quarterly reports regarding progress towards the identity, source, and any plans for the removal of the toxicity. The TRE shall be consistent with EPA guidance, or subsequent procedures approved by the Agency in attempting to identify and remove the source of the toxicity. Routinely scheduled chronic toxicity test batteries required in this permit section shall be suspended for the duration of the TRE. The return to routine testing is subject to successful completion of conformation testing, as determined by the Agency.

#### **Permit Re-opening for WET**

- 2.15 Based on the results of the testing, the permit may be modified to include additional toxicity testing and a whole effluent toxicity limit.

### **3. Whole Effluent Toxicity Requirement Definitions**

- 3.1 “Chronic Toxicity Test” is a static renewal test conducted on an exponentially diluted series of effluent. The purpose is to calculate appropriate biological effect endpoints (NOEC/LOEC or IC25), specified in the referenced chronic manual (Item 2.14). A statistical effect level less than or equal to the Receiving Water Concentration (RWC) constitutes a positive test for chronic toxicity. The RWC equals the 100 percent effluent concentration, or 1 TUc.
- 3.2 “Chronic toxic unit (TUc)” is the reciprocal of the effluent dilution that causes no unacceptable effect on the test organisms by the end of the chronic exposure period. “e.g.,  $[7Q_{10} \text{ flow (mgd)} + \text{effluent average dry weather flow (mgd)}] / \text{effluent average dry weather flow}$ ”